

Algebra 2 - Conditional Probability and Independence - Worksheet

Common Core S-CP.A.1, S-CP.A.2, S-CP.A.3, S-CP.A.4, S-CP.A.5, S-CP.B.6, S-CP.B.7, S-CP.B.8, S-CP.B.9 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice conditional probability and independence (Common Core S-CP.A.1 through S-CP.B.9). The first problems check sample spaces, complements, and the addition rule, the middle problems add two-way tables, tree diagrams, and independence checks, and the last six are word problems and multi-step tasks that need counting arrangements and interpreting medical test results.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **S-CP.A.1, S-CP.A.2, S-CP.A.3, S-CP.A.4, S-CP.A.5, S-CP.B.6, S-CP.B.7, S-CP.B.8, S-CP.B.9**

Exercise 1 - Sample space

List the sample space for flipping two coins, and find the probability of getting exactly one head.

Exercise 2 - Two dice

First die						
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12
	1	2	3	4	5	6

All 36 outcomes for two dice; the sums of 7 are highlighted.

Two fair dice are rolled. Use the grid to find the probability that the sum is 7.

Exercise 3 - Complement

Find the probability that the sum of two dice is NOT 7.

Exercise 4 - Union of events

A card is drawn from a standard 52-card deck. Find $P(\text{heart or king})$.

Exercise 5 - Mutually exclusive

A number from 1 to 20 is chosen at random. Find the probability that it is a multiple of 5 or a multiple of 7.

Exercise 6 - Independent events

A die is rolled and a coin is flipped. Find the probability of an even number and heads.

Exercise 7 - Test independence

Events A and B have $P(A)=0.4$, $P(B)=0.5$, and $P(A \text{ and } B)=0.2$. Are they independent?

Exercise 8 - Read a two-way table

	Grade 10	Grade 11	Total
Plays a sport	30	20	50
No sport	50	100	150
Total	80	120	200

Counts for 200 students.

Find the probability that a randomly chosen student from this table plays a sport and the probability that the student is in Grade 11.

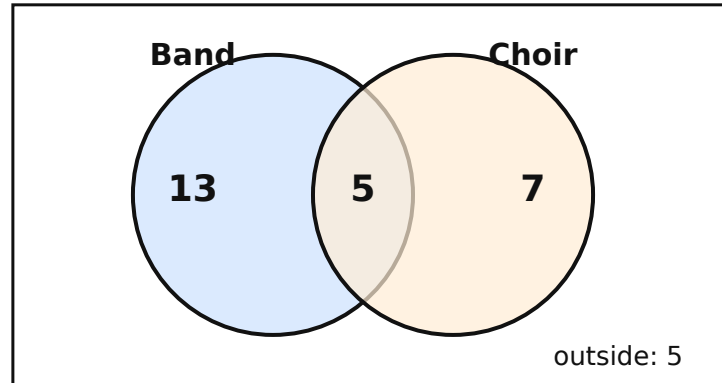
Exercise 9 - Conditional probability from a table

Using the table above (30 and 20 in the sport row, 50 and 100 in the no-sport row), find $P(\text{plays a sport} \mid \text{Grade 11})$.

Exercise 10 - Independence in a table

Using the same table, decide whether playing a sport and being in Grade 11 are independent.

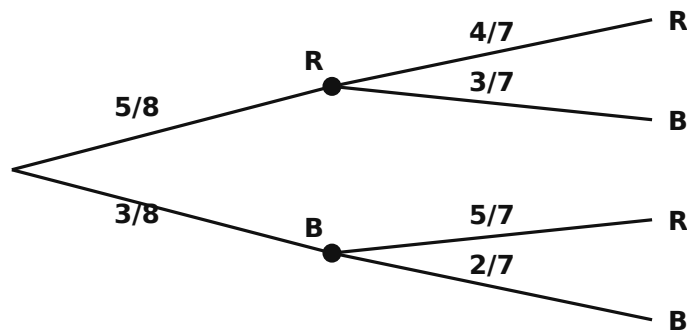
Exercise 11 - Venn diagram



Band and choir.

Of 30 students, 18 are in band, 12 are in choir, and 5 are in both. Find the probability that a random student is in band or choir.

Exercise 12 - Without replacement



Two draws from a bag of 5 red (R) and 3 blue (B) marbles, without replacement.

A bag has 5 red and 3 blue marbles. Two are drawn without replacement. Find the probability that both are red.

Exercise 13 - With replacement

The marble is replaced after the first draw (5 red, 3 blue). Find the probability that both marbles are red.

Exercise 14 - One of each color

Without replacement from the same bag (5 red, 3 blue), find the probability of one red and one blue in either order.

Exercise 15 - Permutations

Five runners finish a race. In how many ways can first, second, and third place be awarded?

Exercise 16 - Combinations

A coach picks 3 players from a group of 8 for a relay team. How many teams are possible?

Exercise 17 - Committee probability

A committee of 3 is chosen at random from 4 girls and 6 boys. Find the probability that it has exactly 2 girls and 1 boy.

Exercise 18 - Medical test

	Positive	Negative	Total
Has the disease	95	5	100
No disease	495	9,405	9,900
Total	590	9,410	10,000

Disease test results for 10,000 people.

One percent of people have a disease. A test is positive for 95% of people with the disease and 5% of people without it. Using the table for 10,000 people, find the probability that a person with a positive test has the disease.

Exercise 19 - At least one

Find the probability of rolling at least one 6 in three rolls of a die.

Exercise 20 - Find the error

Mei says that if $P(A)=0.3$, $P(B)=0.4$, and the events are mutually exclusive, they are also

independent. Explain the error.

Exercise 21 - Addition rule

Events A and B have $P(A)=0.5$, $P(B)=0.4$, and $P(A \text{ or } B)=0.7$. Find $P(A \text{ and } B)$.